ASTER Decorrelation Stretch Product
Version 2.3, December 2000

This is the initial release version of the Decorrelation Stretch product. It is a visualization tool to enhance the color variations among objects within a scene. The effect of the process is to obtain an output image whose pixels are well distributed among all possible colors, while preserving the relative sense of the hue, saturation, and intensity of the input image.

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1. Where to get detailed information on this product

There are several sources of information that users will find useful:

ASTER Decorrelation Stretch Algorithm Theoretical Basis Document (ATBD).
     This document describes the algorithm used to create the product. It is available at

        http://eospso.gsfc.nasa.gov/atbd/astertables.html

ASTER Higher-Level Product User Guide. This describes each of the ASTER Higher Level products in
     detail, including definitions of each metadata attribute and the science data fields. It is available at
     the ASTER website (see below).

US ASTER Website. This describes the ASTER instrument, how to obtain data, the various data
     products that are available, the activities of the US ASTER Science Team, etc.

        http://asterweb.jpl.nasa.gov/

Level 1 product information. Because the Decorrelation Stretch product is derived from a Level 1
     product, understanding the L1 products is useful.

     The Level 1 ATBD available at

        http://eospso.gsfc.nasa.gov/atbd/astertables.html

     The Level 1 User Guide available at

        http://www.science.aster.ersdac.or.jp/users/defaulte.htm

2. How to report problems

To report a problem with the product, please send mail to edc@eos.nasa.gov or call EDC DAAC User Services at (605) 594-6116.

3. Description of this version

Decorrelation Stretch V2.3

Changes

Initial Release

Product Quality

Overall, the Decorrelation Stretch product appears to be performing as expected, and producing satisfactory products.

For scenes of normal variability, correlation coefficients are typically less than 0.01 in absolute value (0.0 is the ideal case), and channel means are within 0.3 DN (0.2 percent) of target value. The channel standard deviations are typically 1 to 2 DN below the target value. This bias toward low standard deviations is expected; it is caused by the truncation of those output values which the destretch transformation maps to an out-of-range value. There are no plans to compensate for this small bias in future releases.

For extremely uniform scenes (e.g. ocean) output correlation coefficients are typically 0.1, and may be significantly higher. The channel means are generally within 1.0 DN of the target value, but channel standard deviations are sometimes as much as 50% low. This is a result of the input statistics being dominated by outlier values (non-Gaussian statistics).

Problems and limitations

The current product differs from the specifications in the ATBD in three ways.

First, for the destretch of the TIR channels, the ATBD indicates that Bands 10, 12 and 14 are used in the browse images and are the default selections for user requested products. Bands 10, 12, and 13 are the channels actually used in the browse, and provided as defaults. It is anticipated that the ATBD will be amended to reflect this change.

Second, the ATBD indicates that pixels that have been tagged as cloud covered are excluded from the input statistics. Currently, these pixels are included in the input statistics. This feature is expected to be implemented in a future version.

Third, the ATBD describes a report file, which contains the input statistics, principal component eigenvalues and eigenvectors, and the transformation applied to produce the output product. This has been implemented as product metadata, but is not contained in the separate metadata file provided with the product. Instead, it is embedded as metadata within the image product hdf file. The items are all collected in the group named "dst_specific".

The target standard deviation for each output band is defaulted to 50 DN. This value produces a fairly harsh (high contrast) image, and the default value may be lowered at some future date. The proper amount of contrast is a matter of personal taste, and potential users are reminded to select a lower standard deviation, if a more subdued image is preferred.

4. Version History

Initial Release